REMARKS

Claims 1-14 and 17-19 are pending in the application. The following remarks are believed to be fully responsive to the Office Action mailed May 19, 2005 and are believed to indicate why all the pending claims are in condition for allowance. Allowance of the application is requested in view of the following remarks.

CLAIM REJECTIONS – 35 USC § 102

Claims 1, 2, 8, and 14 were rejected under 35 USC 102(b) over Cox et al. (4,332,225). This rejection is believed to be in error for at least the following reasons. Although the Examiner asserts that Cox discloses "an oxygen sensor and heater control of the oxygen sensor by measuring capacitance 43 between an electrode 41 and a shell that is connected to ground," the Cox reference does not disclose such heater control. Not counting the claims, the Cox reference mentions capacitance only 11 times: 3 times in the ABSTRACT, in column 2 lines 6, 13, 38, and 60, column 3, line 69 (referring to external capacitor 35), and column 4, lines 20 and 46. None of these references to capacitance disclose or suggest the measurement of capacitance during the operation of a motor vehicle, nor do they disclose or suggest that measurement of capacitance is in any way used to control power supplied to the heater of an oxygen sensor or to determine heater rod temperature. As stated in Column 2 of Cox, beginning at line 16,

> Therefore, as shown in the waveforms of FIG. 4, the current to heater element 37 is shut off a certain predetermined time before the reading of the sensor by the computer, which is done on a periodic basis. This allows any excess charge on capacitance 43 to discharge so that the output voltage of the sensor accurately shows the voltage on voltage source 40.

Thus Cox discloses that the heater current is cycled periodically, not set in response to measurement of an internal capacitance.

More specifically, Cox does not disclose or suggest "applying power to a heater of the oxygen sensor in response to the measured capacitance" as recited in Claim 1. Cox

never discloses or suggests measuring capacitance, and specifically fails to disclose or suggest the measurement of capacitance to control heater temperature. Claims 2 and 8 are dependent on Claim 1, and distinguish over Cox for at least the same reason as does Claim 1. In addition, Cox does not disclose or suggest "determining heater rod temperature settings in response to the capacitance measured; and programming a control unit ... to achieve the determined heater rod temperature settings" as recited in Claim 8.

Cox does not disclose or suggest "providing a first electrode ... and a second electrode ... configured to facilitate measurement of capacitance between the outer electrode and the shell during operation of the motor vehicle" as recited in Claim 14. Accordingly, it is believed that Claims 1, 2, 8, and 14 all distinguish over the cited Cox reference because the reference fails to disclose one or more recited elements in each of the claims.

CLAIM REJECTIONS – 35 USC § 103

Claims 3-5, 9-13, and 17 were rejected under 35 USC § 103(b) as unpatentable over Cox et al. in view of Takami et al. (6,084,418). This rejection is believed to be in error for at least the following reasons. First, Claims 3-5, 9-13, and 17 are dependent, either directly or indirectly, from independent Claim 1. As explained above, Cox fails to disclose or suggest recited elements of Claim 1 (and also Claims 2, 8, and 14). The Takami reference does not disclose the recited elements missing from the Cox reference. There is no disclosure or suggestion in Takami of measurement of any capacitance value. More importantly, there is no disclosure or suggestion in Takami that the power applied to a heater of an oxygen sensor is in response to a measured capacitance as recited in Claim 1. Claims 3-5, 9-13, and 17 therefore distinguish over the cited reference for at least the same reasons as does the independent claim from which they depend.

In addition, Claim 3 recites "applying a first level of power to the heater if the capacitance is greater than a first predetermined capacitance value and the rate of change of measured capacitance is greater than a first predetermined rate." Neither Cox nor Takami discloses the measurement of either capacitance or rate of change of capacitance, and thus the cited references cannot suggest the claimed step of applying a power level

based on such a measurement. Claims 4 and 5, each of which depends from claim 3, recite further steps relating to the application of power to the heater of an oxygen sensor based on measurements of capacitance or rate of change of capacitance. Claims 4 and 5 thus distinguish over the combination of Cox and Takami for at least the same reasons claim 3 distinguishes over the combination.

In a similar manner, claim 9 recites the step of "selecting a first heater rod temperature setting for a first temperature in response to measuring a capacitance greater than a first predetermined capacitance and a rate of change of capacitance greater than a first predetermined rate." The cited Cox and Takami references do not disclose or suggest the measurement of either capacitance or rate of change of capacitance and thus cannot suggest the claimed step of selecting a first heater rod temperature based on such a measurement. Claims 10 and 11, each of which depends from Claim 9, recite further steps relating to the selecting of a heater rod temperature based on measurements of capacitance or rate of change of capacitance. Claims 10 and 11 thus distinguish over the cited combination of Cox and Takami for at least the same reasons Claim 9 distinguishes over those references.

Claim 12, which depends from Claim 8 and thus from independent Claim 1, recites "programming the control unit further comprises the step of programming the control unit to supply a first power level to the heater rod to achieve a first heater rod temperature for a first predetermined motor vehicle operating time." Neither Cox nor Takami discloses or suggests the step of setting a first heater rod temperature based on a first motor vehicle operating time. Claim 13, which depends from Claim 12, adds a further step in controlling the heater rod temperature in response to the motor vehicle operating time exceeding a predetermined time. The additional step is neither disclosed nor suggested by either Cox or Takami. Claims 12 and 13 thus also distinguish over the cited references taken alone or in combination.

Claim 17 recites, in part, "measuring capacitance and rate of change of capacitance between the electrode and the shell." Based in part on these measurements, the power level of heater power is maintained or increased. Neither Cox or Takami discloses or suggests the steps of measuring either capacitance or rate of change of

capacitance. The cited references therefore also cannot suggest the additional steps of setting power levels in response to capacitance and rate of change of capacitance measurements. Similarly, there is no disclosure or suggestion in the cited reference that capacitance between the outer electrode and the case of a test sensor mounted in a motor vehicle be measured as a function of operating conditions of the motor vehicle, that heater rod temperature settings be determined in response to the capacitance measured, and that a control unit of a motor vehicle in which an oxygen sensor is to be installed be programmed to supply heater power to the heater rod of the oxygen sensor to achieve the determined heater rod temperature settings. Accordingly, Claim 17 cannot be obvious in view of the cited combination of Cox with Takami because a number of recited method steps are not suggested by the references.

Claims 6, 7, 18, and 19 were rejected under 35 USC § 103(b) in view of Cox, Takami, and Tomisawa (2003/0010088). This rejection is believed to be in error for at least the following reasons. Claims 6 and 7 depend either directly or indirectly from claim 1 and claims 18 and 19 depend either directly or indirectly from claim 17 and hence also from Claim 1. Claims 1 and 17 distinguish over the cited Cox in view of Takami for the reasons given above. The Tomisawa reference does not disclose or suggest the steps of measuring capacitance and applying power to a heater in response to the measured capacitance, nor does it disclose or suggest measuring rate of change of capacitance and maintaining or increasing power level in response to the measured rate of change of capacitance. The Tomisawa reference thus fails to supply at least these elements missing from the combination of Cox and Takami. Claims 1 and 17 as well as claims 6, 7, 18, and 19 thus distinguish over the cited combination of references for at least the reasons set forth above with respect to claims 1 and 17. In addition, although the Tomisawa reference discloses a timer, there is no disclosure or suggestion that the time measured is used to set the power level of a heater in an oxygen sensor. The timer referred to in Tomisawa does not measure time after detecting the starting of the engine (as claimed), but rather measures time "after the above-mentioned judgment." Accordingly, claims 6, 7, 18, and 19 distinguish over the cited combination of Cox, Takami, and Tomisawa.

CONCLUSION

In view of the foregoing remarks, it is now believed that claims 1-14 and 17-19 distinguish over the cited references, either taken alone or in combination, and are in condition for allowance. Such allowance is therefore earnestly requested.

If for some reason Applicant has not requested a sufficient extension and/or has not paid a sufficient fee for this response and/or for the extension necessary to prevent abandonment on this application, please consider this as a request for an extension for the required time period and/or authorization to charge Deposit Account No. 07-0960 for any fee which may be due.

Respectfully submitted,

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